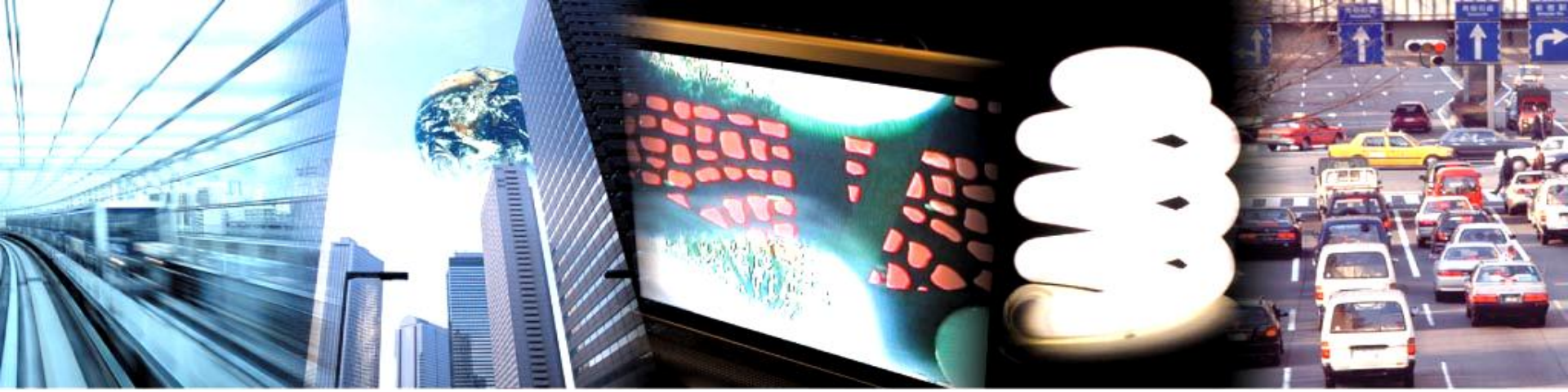


APERC Annual Conference

26 February 2013

APEC Better Urban Planning Alternative Case

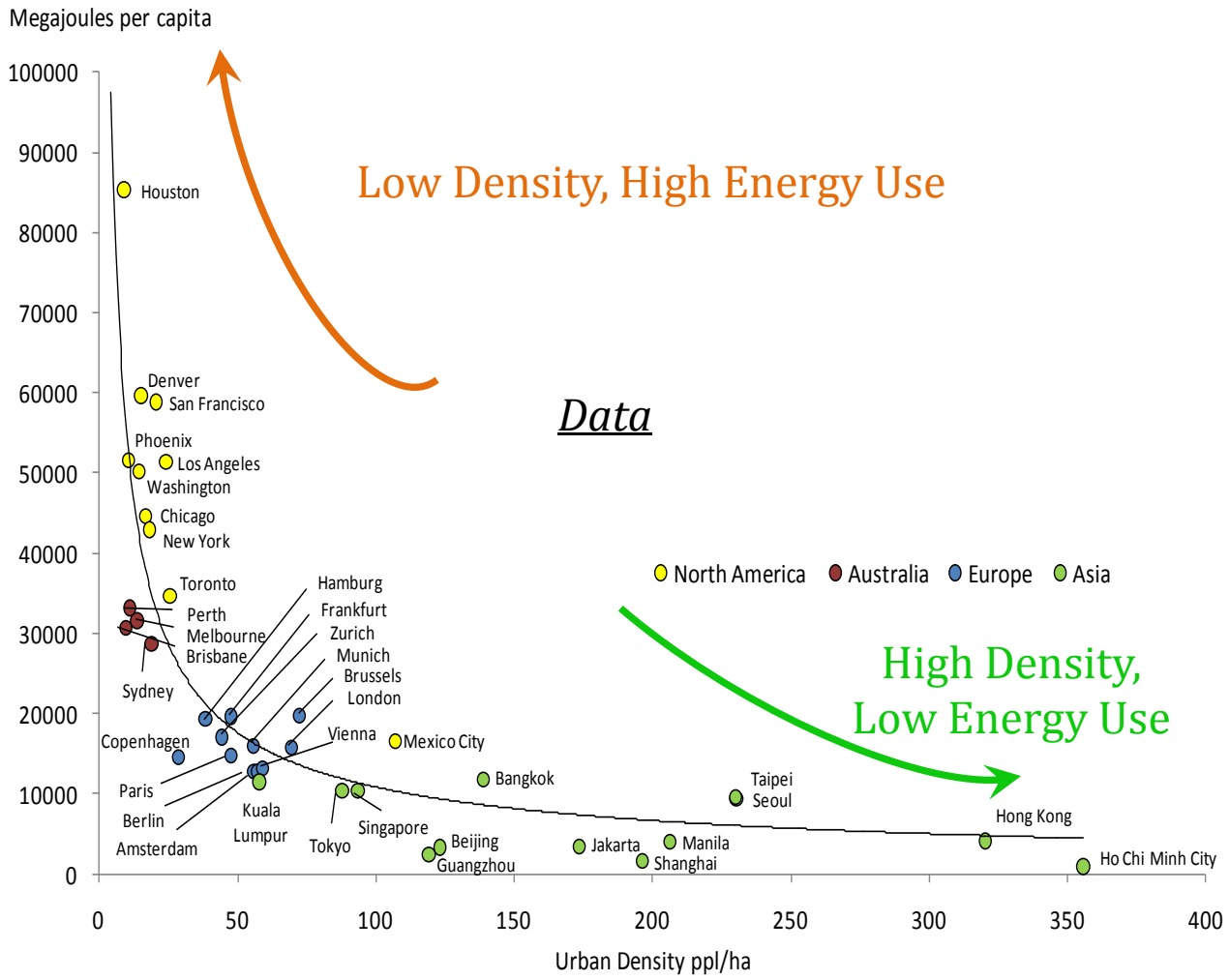
"The Long Term Benefits to Oil Security and GHG Emissions"

Luke Leaver

Asia Pacific Energy Research Centre (APERC)

Asia-Pacific Economic Cooperation

Alternative Urban Development Scenario - Introduction



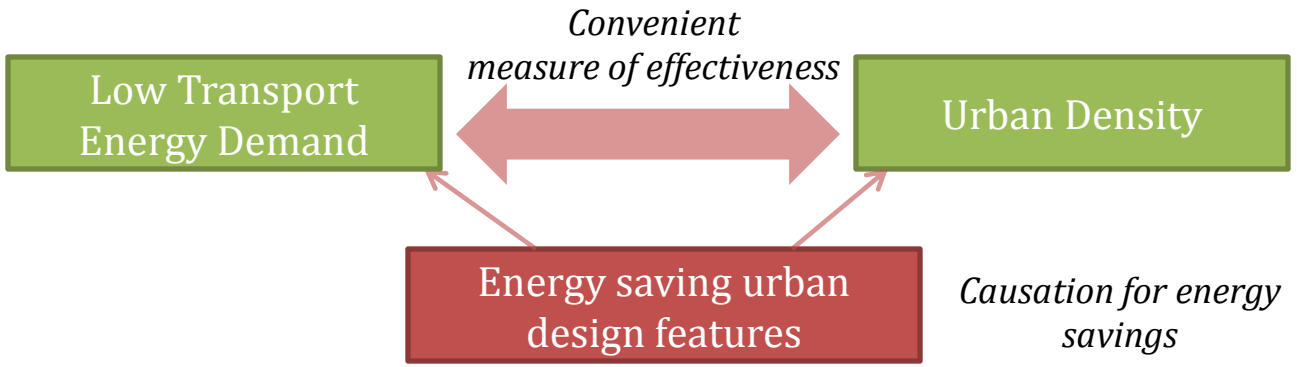
- There is a clear relationship between compact cities with low transport energy demand
- Note that we are **not** claiming that population density alone is the *cause* of low-energy urban design
- Is urban design the key to reducing oil dependency?

Source: Adapted from Kenworthy and Laube (2001), *UITP Millennium Cities Database for Sustainable Transport*

Smart Growth Urban Design

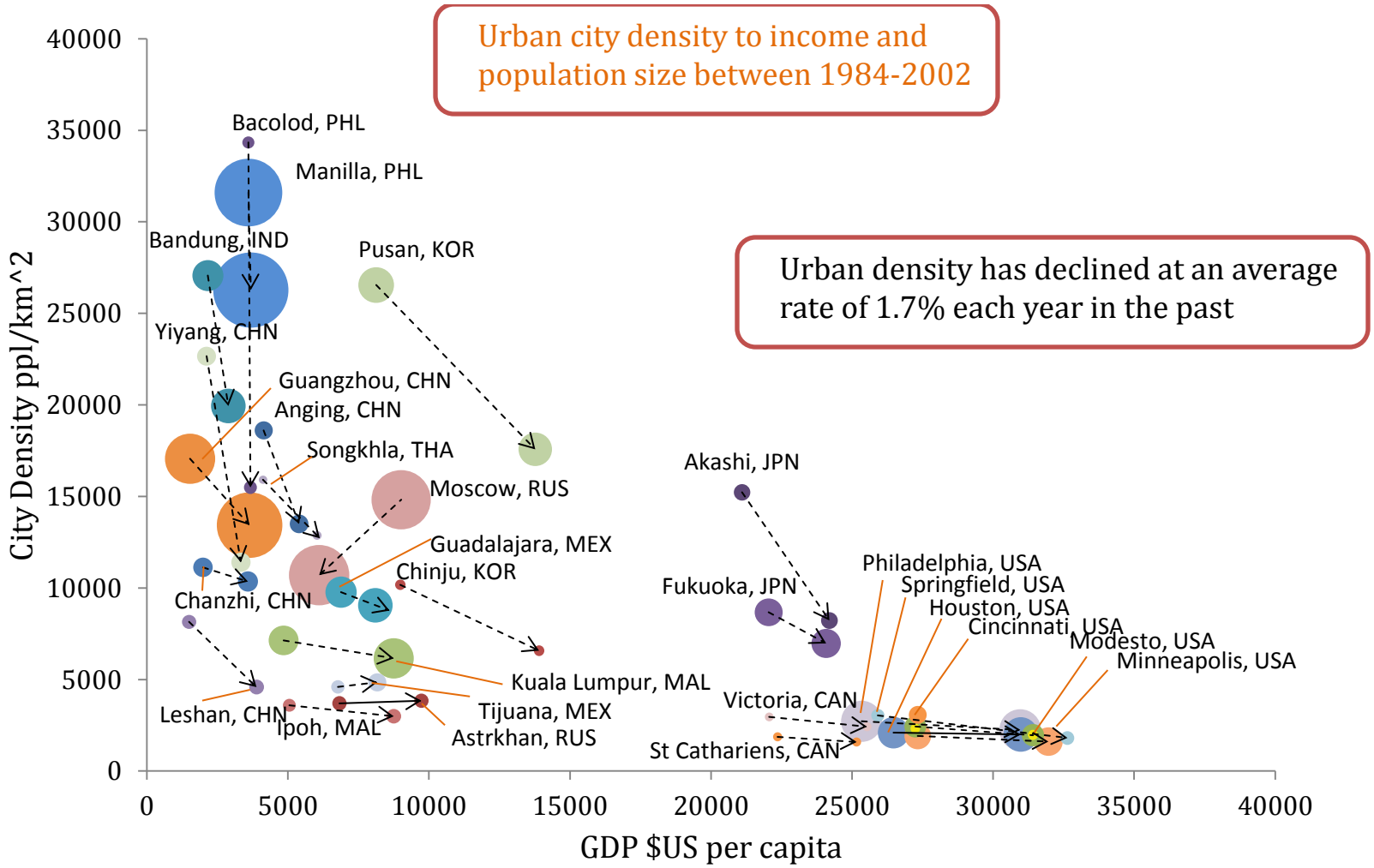
Urban design influences transport energy use in a number of ways…… *the 5 D's* –

- Mixed use development to reduce distances between housing, jobs, shopping and community services *(Density, Diversity)*
- Improve street connectedness to enhance use of walking and bicycles *(Density, Design)*
- High quality public transit services *(Density, Distance to transit)*
- De-emphasis of urban motorways and parking development which promotes vehicle use *(Density, Destination accessibility)*



APERC analysis & Ewing R., Bartholomew K., Winkelman S., Walter J. and Chen D. (2008) *Growing Cooler: The Evidence on Urban Development and Climate Change*. The Urban Land Institute, Washington, USA.

Historically Urban Density in APEC has Decreased



Source: Data adapted from Angel S., Sheppard S.C. and Civco D. (2005) *The Dynamics of Global Urban Expansion*. The World Bank Transportation and Urban Development Department. Washington, DC, USA; p. 205.

Urban Population in the APEC Region Expect to Increase Dramatically

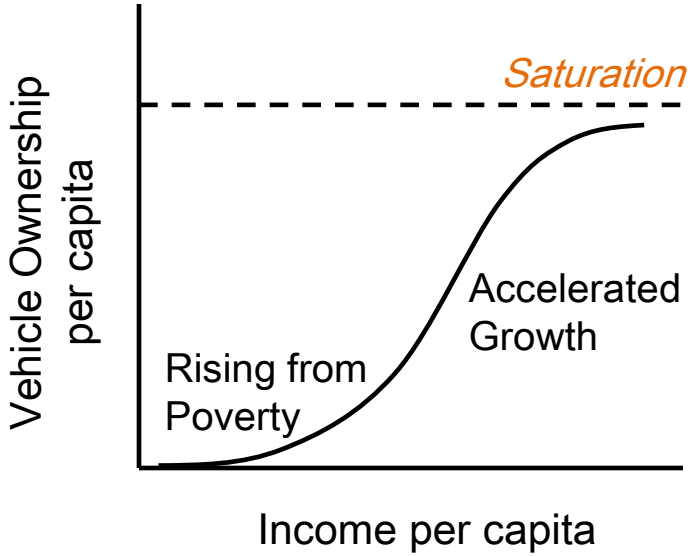
(million people)	2010	2035	2050
Total APEC OECD and Non-OECD Urban Population	1601	2200	2327
% Change from 2010		+37%	+45%
Total APEC Non-OECD Urban Population	1037	1518	1606
% Change from 2010		+46%	+55%
Total APEC Non-OCED + Mexico and Chile Urban Population	1140	1653	1749
% Change from 2010		+45%	+53%

- Urban Population growth much higher in the *developing* economies

Source: United Nations, Department of Economic and Social Affairs, Population Division, *World Urbanization Prospects: The 2011 Revision*

Income and Vehicle Ownership

- Vehicle ownership growth is strongly influence by income
- There is a saturation point when vehicle ownership decouples from income
- How cities are developed strongly influences when saturation is reached



Consequence of affluence & Urban Population Growth in Developing APEC

Non-OECD + Mexico and Chile APEC Economies	2010	2035	% Change from 2010
Total Population [millions]	2 202	2 413	+10%
Urban Population [millions]	1 140	1 749	+53%
GDP/Capita [US$ PPP]	7 619	27 214	+257%
Vehicle Ownership [Vehicles per 1000 people]	93	339	+265%
Oil Demand [Mtoe]	199	410	+106%

- GDP (*and vehicle ownership*) projected to more than double by 2035 from 2010
- Urban population growth *exceeds* growth in total population

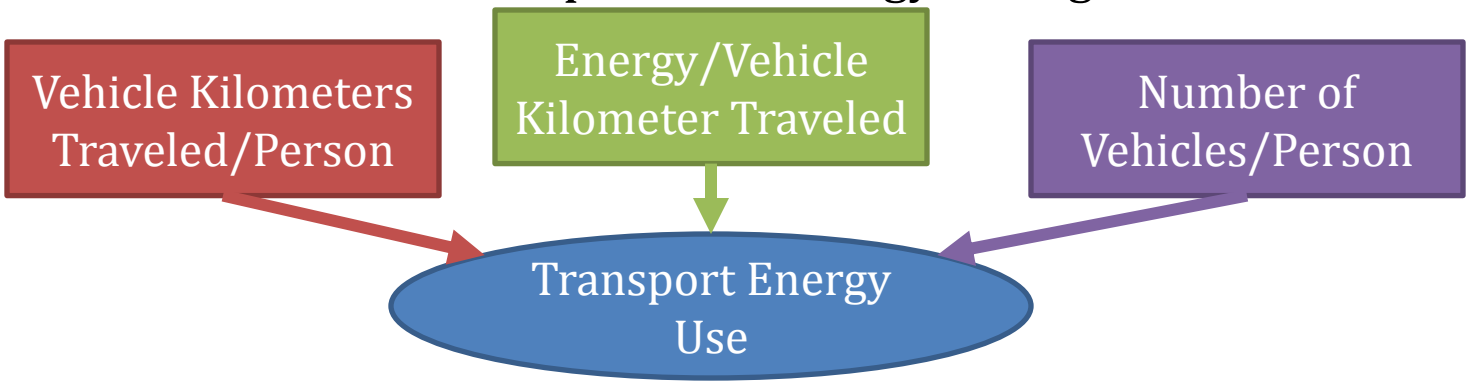
Sources: APERC analysis and United Nations (2011)

The Closing Opportunity for Energy Savings Urban Design

- The huge scale of city-building in developing APEC economies over the next 40 years will be unlike anything seen anywhere in the past
- Growing populations combined with growing wealth will lead to rapid growth in vehicle ownership and urban transport energy use
  - The consequences are likely to include growing oil security and oil price risks, traffic congestion, air pollution, and greenhouse gas emissions
- How these growing cities are designed will strongly impact the patterns of urban transport and transport energy use
  - But once the cities are built, these patterns become very hard to change

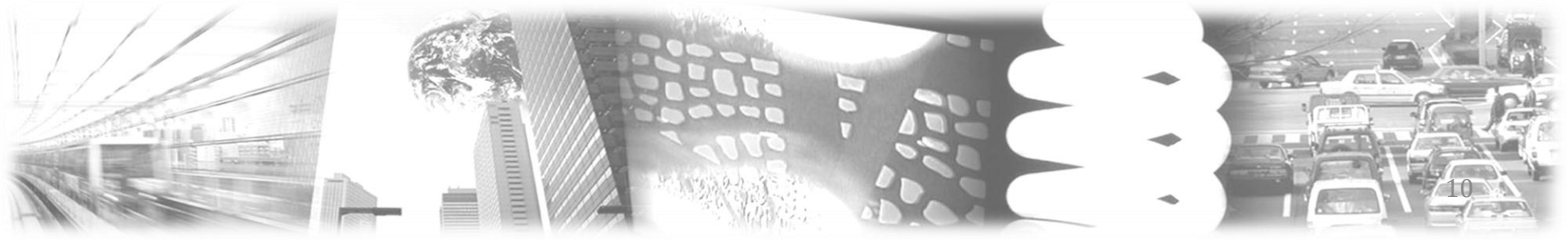
Alternative Urban Development Scenario - Model

- The interaction between urban planning and vehicle transportation was modeled to assess the potential energy savings:



- Three scenarios (and one business as usual case) were modeled:
  - **Business-as-usual** - Urban density continues to decline at the historical world average of 1.7% per annum.
  - **High Sprawl** - Urban density declines at 3.4% per annum (or twice the historical average), leading to rapid urban area expansion.
  - **Constant Density** - Urban density is maintained at a constant level (2009) where city expansion is in line with population growth.
  - **Fixed Urban Land** - Urban land area is fixed and population growth is contained inside existing urban boundaries.

Key Findings

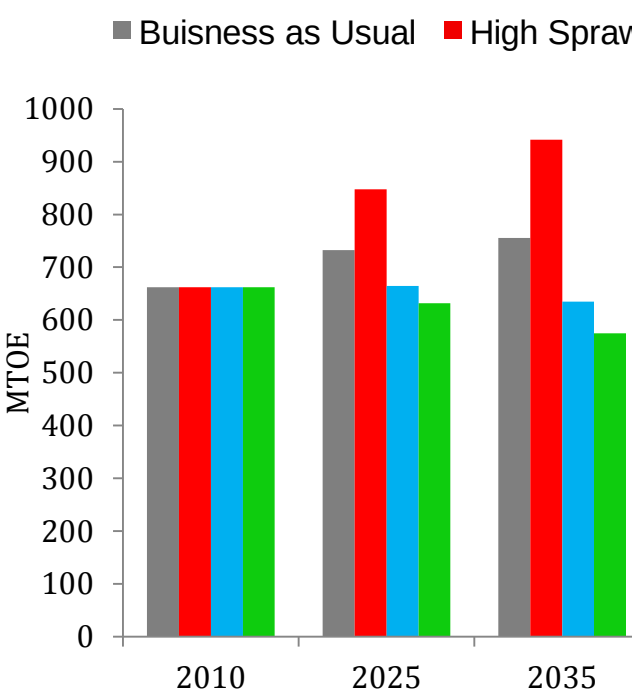


Alternative Urban Development Scenario – Overall Results for Oil Demand and CO_2 Emissions

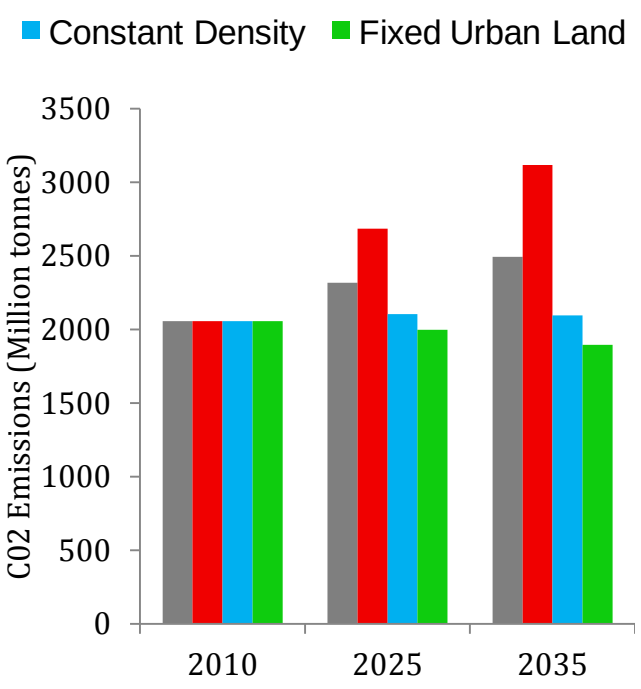
Introduction

- The rapid growth of APEC's economies presents a unique opportunity to build cities in an energy efficient manner.

Light Vehicle Oil Consumption



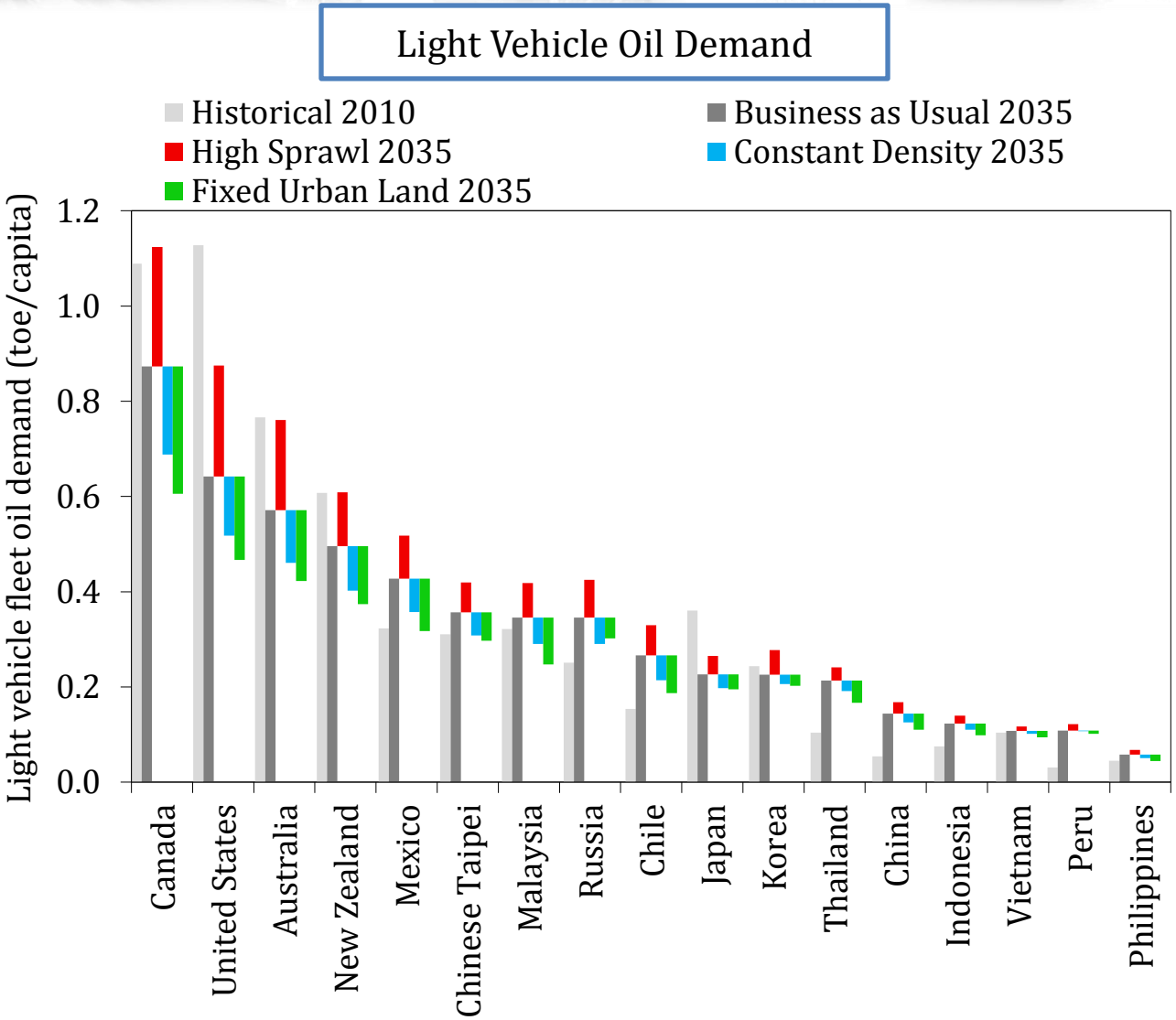
Light Vehicle CO_2 Emissions



- Compact cities *tend* to favor transport energy-saving features in greater abundance
- Results consistently show that cities with lower population densities has higher energy demand

Source: APERC Analysis

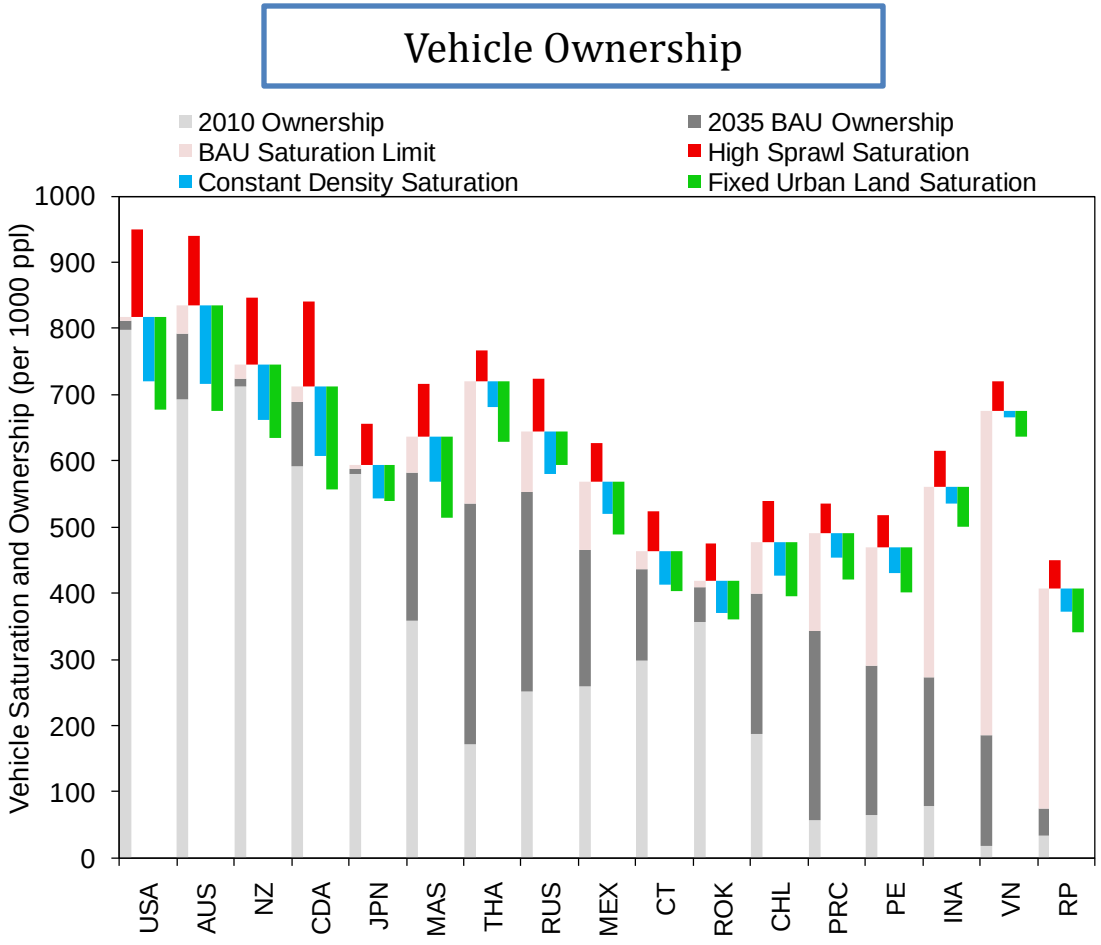
Urban Development – Results by Economy for Oil Demand



- Non-OECD economies still undergoing rapid growth in oil demand from rising income

Source: APERC Analysis

Urban Development –
Results by Economy for Vehicle Ownership



- Non-OECD economies still undergoing rapid growth in oil demand from rising income

Source: APERC Analysis

Points to Ponder

- *One time opportunity* in developing cities to implement smart urban design before its too late
- Once cities are developed it becomes very difficult to alter land use and the window is *closing quickly*
- The oil saving benefits of smart compact urban design is *very significant*
- Developing compact cities will require *co-operation* between different federal and local government agencies

Thank you for your attention

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